

## SHOW FILES

File 16:Gale Group PROMT(R) 1990-2003/Jul 10  
(c) 2003 The Gale Group  
File 47:Gale Group Magazine DB(TM) 1959-2003/Jul 02  
(c) 2003 The Gale group  
File 148:Gale Group Trade & Industry DB 1976-2003/Jul 10  
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Set	Items	Description
S1	3545	(FREE (4N) SERVICE) (S) COMPUTER
S2	277	S1 AND ISP
S3	139	S2 NOT PY>1999
S4	13	S3 AND ((BUY? OR PURCHAS?) (5N) COMPUTER)
S5	319	S1 AND (PROMOTION?)
S6	71	S5 AND (INTERNET () SERVICE)
S7	36	S6 NOT PY>1999
S8	7457	(PROMOTION (S) (COMPUTER AND SERVICE))
S9	88	S8 AND (FREE () SERVICE)
S10	50	S9 NOT PY>1999
S11	43	RD (unique items)
S12	9	(FREE () SERVICE) (S) (PURCHAS? (4N) COMPUTER)

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## \* SHOW FILES

File 16:Gale Group PROMT(R) 1990-2003/Jul 10  
(c) 2003 The Gale Group  
File 47:Gale Group Magazine DB(TM) 1959-2003/Jul 02  
(c) 2003 The Gale group  
File 148:Gale Group Trade & Industry DB 1976-2003/Jul 10  
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Set	Items	Description
S1	270	(WARRANTY ( ) PLAN)
S2	19	S1 AND ((CHOOS? OR SELECT? OR PICK? OR OPTION?) (4N) PLAN)
S3	8	S2 NOT PY>1999
S4	0	S1 AND (FREE ( ) SERVICE)
S5	15	S1 AND (INCENTIVE OR PROMOTION)
S6	10	S5 NOT PY>1999
S7	1	S1 AND (DIGITAL ( ) CAMERA)
S8	15	S1 AND (SERVICE ( ) PLAN)
S9	7	S8 NOT PY>1999
S10	43	(FREE ( ) SERVICE) (5N) (INCENTIVE OR PROMOTION)
S11	19	S10 NOT PY>1999
S12	15	RD (unique items)
S13	72	(CAMERA) (S) (FREE (4N) (DEVELOPING OR PRINTS))
S14	51	S13 AND (DIGITAL ( ) CAMERA)
S15	2	S14 NOT PY>1999
S16	13	S13 NOT PY>1999

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16/9/4 (Item 4 from file: 16)

DIALOG(R)File 16:Gale Group PROMT(R)

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03534897 Supplier Number: 44958320 (THIS IS THE FULLTEXT)

**Creative Gallery: 'Olympus Camera Craze'**

Promo, v0, n0, p93

Sept, 1994

ISSN: 1047-1707

Language: English Record Type: Fulltext

Document Type: Magazine/Journal; Trade

Word Count: 121

TEXT:

Campaign: 'Olympus Camera Craze'

Agency: SJI, Inc., St. Louis

Client: Olympus America

Communications Disciplines: Counter tents, camera stand enhancers,  
display case static cling decals, savings books

Creative Director: Rip Kastaris

Overview: Olympus and Target stores linked up to offer consumers a summer promotion they couldn't afford to pass up. Target customers could receive free Summer Savings Books when they purchased any Olympus camera model between the peak photo-taking and camera gift season of May through July. Savings Books contained a variety of photo-related offers, including free rolls of Target film, free Target film developing, \$1 off Duracell batteries and dollars off multiple film packs, enlarged prints and photo albums. The program was supported with P-O-P materials and ads in Target circulars.

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PUBLISHER NAME: Cowles-SIMBA Information

COMPANY NAMES: \*Olympus Corp America; SJI Inc.

EVENT NAMES: \*480 (Use of services); 610 (Contracts & orders received);  
240 (Marketing procedures)

GEOGRAPHIC NAMES: \*1USA (United States)

PRODUCT NAMES: \*5043000 (Photographic Equip & Supplies Whsle); 7318000  
(Sales Promotion Services)

INDUSTRY NAMES: ADV (Advertising, Marketing and Public Relations); BUSN  
(Any type of business)

NAICS CODES: 42141 (Photographic Equipment and Supplies Wholesalers);  
5418 (Advertising and Related Services)

SPECIAL FEATURES: LOB; COMPANY

ADVERTISING AGENCY: SJI

ADVERTISING CODES: 74 Campaign Launched; 42 Account Activity

7/9/27 (Item 5 from file: 148)

DIALOG(R)File 148:Gale Group Trade & Industry DB

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11114064 SUPPLIER NUMBER: 54765247 (THIS IS THE FULL TEXT)

**PONY TAKES RIDE INTO RETAILING: COMPUTER OUTLET STORE TO OPEN. (Pony Computer Inc.)**

BEAUPREZ, JENNIFER

Crain's Cleveland Business, 2

May 31, 1999

ISSN: 0197-2375

LANGUAGE: English

RECORD TYPE: Fulltext

WORD COUNT: 560

LINE COUNT: 00045

TEXT:

If Joseph Chou has his way, a good chunk of the 100,000 households in Streetsboro, Aurora and Twinsburg will know the name Pony Computer before long.

As president of Pony Computer Inc., a maker of personal computers, Mr. Chou plans to take full advantage of the company's new \$3 million headquarters in Streetsboro by opening a factory outlet store there next week and for the first time selling PCs directly to consumers.

"It gets our name out there," Mr. Chou said. "We've been around 11 years and not too many people know our name."

For the most part, it has been techies running networks of business computer systems who know Pony. Businesses have been Pony's key customer since the Taiwan-born Mr. Chou started the company in 1988 following his graduate work in computer science at Ohio University.

A natural entrepreneur with a competitive streak, the 41-year-old Mr. Chou has grown the company over the ensuing years to \$62 million in annual sales, eight offices and 135 employees. But as PC prices continue to drop and shipping and wage costs rise, prospering in the computer industry will require generating revenue from sources other than Pony's typical customers.

Selling to the home PC user via the new factory outlet store is one way. The Internet is another.

In addition to developing an electronic commerce web site that will give customers the option of buying computer systems and tracking their shipments online, Pony in June will delve into the Internet service provider (ISP) business.

By offering customers a few months of free Internet service with computer purchases, Pony will try to build an ISP business to keep in touch with customers who bought its PCs.

"We can send out advertisements to the customer (via the Internet) and allow them to go into our e-commerce area," Mr. Chou said. "The customer would know us immediately."

Meantime, James Norton, Pony's sales and marketing director, is putting together a marketing plan to get the attention of computer users who live near the company's headquarters.

Pony next week will start using radio promotions, newspaper ads and coupons in the mail to plug the opening of its factory outlet store and to promote inexpensive, \$499 computers available there.

Mr. Norton said he expects the factory outlet to bring in an additional \$6 million in revenues each year for Pony. And since no more than 50% of U.S. households have a PC today, it leaves plenty of room for growth, he said.

"That's where the market is heading," Mr. Norton said. "You will see over time that PCs will be like a VCR. You turn it on, and it works. It's inexpensive, and a lot of consumers don't care what's in it."

Mr. Norton said the company contemplated selling dented and scratched computers to consumers long ago, but it didn't have adequate space inside

its previous home, a leased, 30,000-square-foot building in Solon.

Since Pony moved four months ago into its 50,000-square-foot Streetsboro home, the company now has the space for a 3,000-square-foot outlet store, he said.

"It's a good testing vehicle for new products," Mr. Norton said. "And it will help with brand awareness."

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COMPANY NAMES: Pony Computer Inc.--Planning

INDUSTRY CODES/NAMES: BUSN Any type of business; REG Business,  
Regional

DESCRIPTORS: Computer industry--Planning; Computer stores--Planning;  
Microcomputers--Marketing

GEOGRAPHIC CODES/NAMES: 1USA United States; 1U3OH Ohio

NAMED PERSONS: Chou, Joseph--Management

PRODUCT/INDUSTRY NAMES: 3573120 (Microcomputers)

EVENT CODES/NAMES: 220 Strategy & planning

NAICS CODES: 334111 Electronic Computer Manufacturing

FILE SEGMENT: TI File 148

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16/9/1 (Item 1 from file: 16)

DIALOG(R) File 16:Gale Group PROMT(R)

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04675792 Supplier Number: 46882011 (THIS IS THE FULLTEXT)

**Agfa Rolls First APS Disposable**

Brandweek, p16

Nov 11, 1996

ISSN: 1064-4318

Language: English Record Type: Fulltext

Document Type: Magazine/Journal; Trade

Word Count: 289

TEXT:

Steve Gelsi

Agfa, the photo unit of Bayer AG, continues its strategy to become more consumer-friendly with a first-quarter promotion for its paper, a la Kodak's longtime 'Ask for it' campaign, and linked to the debut of its single-use Advanced Photo System camera at 2,000 specialty photo stores.

By offering coupons, free rolls of film in bundled packs and new packaging, Agfa, which had \$30 million in sales last year, hopes to boost its Prestige photo paper as a call-brand and spur repeat business for its specialty retailers as they compete with more volume-oriented mass merchants.

Agfa has a 20% film market share in specialty photo shops, and has been attempting to lure new customers with account-specific promotional offers like free second prints. The one-time-use camera will be the first of its kind in the new industry-wide APS category.

The Prestige program, being implemented by Goodspeed & Associates, N.Y., will grace Agfa packaging, newly redesigned to look less industrial, with likely offers of free film and free second prints, and posh-looking storage containers for photos. Support will come with in-store signage and displays at Agfa's 2,000 retail partners in the U.S.

Goodspeed earlier this year spearheaded a revise of Agfa film packaging, with sunflowers on the boxes in summer, metallic snowflakes in winter. The company has been attempting to create an ongoing promotional presence for the brand. A current deal offers six packs of Agfa film with two free rolls; another offers free sets of prints and discounts on second purchases of single use cameras.

'We want to get consumers on continuity programs to grow business, rather than hit and run promotions,' said Ricki Goldhamer, account manager for Goodspeed. 'We're trying to build synergy between promotions.'

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PUBLISHER NAME: BPI Communications, Inc.

COMPANY NAMES: \*Agfa; Goodspeed & Assoc

EVENT NAMES: \*480 (Use of services); 610 (Contracts & orders received)

GEOGRAPHIC NAMES: \*1USA (United States)

PRODUCT NAMES: \*3860000 (Photographic Equip & Supplies); 7318000

(Sales Promotion Services)

INDUSTRY NAMES: ADV (Advertising, Marketing and Public Relations); BUSN

(Any type of business)

NAICS CODES: 333315 (Photographic and Photocopying Equipment

Manufacturing); 5418 (Advertising and Related Services)

TRADE NAMES: Advanced Photo System; Prestige

SPECIAL FEATURES: LOB; INDUSTRY; COMPANY

ADVERTISING AGENCY: Goodspeed & Associates

ADVERTISING CODES: 26 Point-of-Purchase Displays; 28 Packaging; 52

Advertising Activity; 55 Company Planning/Goals; 59 Channels of

Distribution; 79 Promotion

TS8/9/2

8/9/2 (Item 2 from file: 16)

DIALOG(R) File 16:Gale Group PROMT(R)

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06808458 Supplier Number: 57587883 (THIS IS THE FULLTEXT)

**Iomega Announces Digital Imaging Strategy, Offers Storage Solutions to Create, Enhance, Edit & Share Images.**

Business Wire, p0059

Nov 16, 1999

Language: English Record Type: Fulltext

Document Type: Newswire; Trade

Word Count: 1202

TEXT:

LAS VEGAS--(BUSINESS WIRE)--Nov. 16, 1999--

Pixel Magic Imaging "Photo Ditto" Kiosks, Agfa Digital Cameras,  
Kodak/Lexmark Printers Just Some of Iomega's New Consumer  
Applications On Display at COMDEX/Fall '99

Iomega today announced its strategy to make removable storage a standard feature in the burgeoning digital imaging market. Iomega Corporation (NYSE:IOM), a leader in smart, portable storage solutions with more than 30 million Zip(R) drives shipped, is demonstrating Pixel Magic Imaging's Photo Ditto v4.0 kiosks and other products from Iomega's digital imaging partners at COMDEX/Fall '99 in Las Vegas. Photo Ditto kiosks from Pixel Magic, a leader in digital imaging, offer innovative photo printing and editing capabilities in drug stores and retail outlets across America and feature Zip 100MB drives as the primary storage and input solution for customers.

"Zip and Klik! disks are perfect companions for digital images because the disks are high capacity, low cost and easy to use," said Keith Slankard, director of Beyond-PC products, Iomega Corporation. "Our partners are building imaging products that use Zip and Klik! drives because these storage solutions help consumers capture, enhance, store, print and share their images. Pixel Magic recognizes this and is able to offer a solution to its Photo Ditto customers that not only saves their newly-shot and edited images to a Zip disk, but also takes shots from other photographic sources and creates a digital photo album."

Photo Ditto kiosks are one-stop digital imaging workstations that have a nationwide presence in retail outlets including the Eckerd Drugs and Meijer chains, retail photo labs and specialty photo retailers across the U.S. The kiosks offer customers a wide variety of tools to use on their digital photos, allowing them to copy photos and film and load files; enhance photos by cropping images or removing red-eye; add text and create calendars or custom cards; even e-mail and upload images to the Internet.

"With each enhancement of our Photo Ditto kiosks, we look to offer our customers the easiest ways to edit, share and store their digital photos," said Laura Oles, vice president of marketing for Pixel Magic Imaging. "Iomega's Zip drives have been standard on the last two versions of the Photo Ditto. They fully support the input and output of our kiosks, and by allowing customers to save high quality/high resolution images on a single Zip disk, rather than multiple floppies, we feel it is one of the most cost-effective storage solutions we can offer."

Removable Storage: It's Not Just For Computers Anymore

As part of Iomega's "Beyond PC" program, Pixel Magic's Photo Ditto v4.0 and other products from Iomega's digital imaging partners will be on display at Iomega's booth (No. L5746) in the Convention Center at COMDEX/Fall '99 in Las Vegas, from November 15 - November 19. The Pixel Magic partnership is part of Iomega's larger effort to provide leading storage solutions to the digital imaging market. Iomega offers a wide range

of solutions as part of its Beyond-PC program for enhancing the digital imaging market and allowing users to capture, enhance, print and share as well as store their images: -0-

**CAPTURE:** Removable 40MB Klik!(TM) disks are used in Agfa's ePhoto CL30 Klik! digital cameras, allowing users to store 10 times the number of pictures as the average 4MB digital camera. The Klik! disk's 40MB capacity eliminates the hassle of viewing multiple images one floppy at a time, and by connecting the camera to a PC via the USB port, all images can be viewed and edited immediately.

**ENHANCE:** Iomega and Adobe Systems Incorporated have teamed up to provide Adobe(R) ActiveShare(TM) software, a free download at [www.iomega.com](http://www.iomega.com). ActiveShare provides an easy way for users to import photos to their computer, organize, enhance and share them in print or online. Iomega Zip(R), Jaz(R) and Klik!(TM) disks provide a mobile solution for ActiveShare customers, allowing them to store, backup and view their photos on Iomega disks.

**PRINT:** Zip(R) external 100MB and 250MB drives are being used with the Kodak Personal Picture Maker, a joint venture between the Eastman Kodak Company and Lexmark International, Inc. With a Zip drive, users can transfer images from a digital camera's memory card to a Zip disk without having to connect the printer to a PC, freeing up the memory card to take more pictures. Users can also print pictures directly from a Zip disk, without connecting the printer to a PC.

**SHARE:** Digital Intelligence, Inc.(TM) develops and licenses digital imaging software that advances the digital photo capabilities of Web sites and consumer electronics devices. Their Picture IQ(TM) software quickly provides powerful, yet reliable, easy-to-use digital photography features such as photo fixing and enhancement, sharing, organizing, and printing. In the Iomega COMDEX booth, Digital Intelligence will demonstrate a potential TV set-top photo viewing appliance solution incorporating Picture IQ software, a built-in Zip(R) drive, and a simple remote control.

About Pixel Magic Imaging, Inc.

Pixel Magic Imaging was one of the first companies to introduce digital photography into the mainstream marketplace in 1992. The company has since expanded to providing a number of system and software solutions to photo retailers, chain stores, studio photographers, and photo entrepreneurs nationwide. Photo Ditto, a product that allows consumers to modify and create copies of prints instantly, has a national presence in



numerous retail stores including Eckerd Drugs and Meijer. The privately-funded company was founded in 1992 and is headquartered in San Marcos, Texas. For more information about Pixel Magic, visit <http://www.pxlmagic.com>.

#### About Iomega

Iomega Corporation (NYSE:IOM) manufactures and markets the award-winning Zip(R), Jaz(R) and Klik!(TM) drives and disks and markets the ZipCD(TM) CD-RW drives and discs that help people to organize, manage, create, exchange and share their important information. Used in homes, businesses, government, education and by creative professionals everywhere, Iomega storage solutions are the enabling technologies preferred by millions. The Company can be reached at 1-800-MY-STUFF (800-697-8833), or on the Web at <http://www.iomega.com>.

Special note: Statements contained in this release relating to Iomega's digital imaging strategy and making Iomega's storage solutions a standard feature in the digital imaging market are forward-looking statements. There are a number of important factors that could cause actual events to differ materially from those indicated by such forward-looking statements, including market acceptance of, and demand for, the Iomega storage devices with digital imaging products, manufacturing issues, including component availability and pricing, development and distribution issues relating to use and integration of Iomega storage solutions in digital imaging products, product pricing and conformity to specifications, competition, intellectual property rights and other risks as identified in Iomega's Annual Report to Stockholders for 1998 on Form 10-K, filed March 26, 1999, and its most recent quarterly reports filed with the SEC.

Copyright (c) 1999 Iomega Corporation. The following trademarks of Iomega Corporation are registered in the U.S. Patent and Trademark Office and in other countries: Iomega, Zip and Jaz. Some other marks which may be registered in some countries are: Zip 100, Zip 250, Klik! and ZipCD. Certain other product names, brand names and company names may be trademarks or designations of their respective owners.

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PUBLISHER NAME: Business Wire

COMPANY NAMES: \*IOMEGA Corp.; Pixel Magic Inc.

GEOGRAPHIC NAMES: \*1USA (United States)

PRODUCT NAMES: \*3573219 (Computer Disk Drives NEC); 3679100 (Magnetic & Optical Media)

INDUSTRY NAMES: BUS (Business, General); BUSN (Any type of business)

SIC CODES: 3572 (Computer storage devices); 3679 (Electronic components, not elsewhere classified)

NAICS CODES: 334112 (Computer Storage Device Manufacturing); 334613 (Magnetic and Optical Recording Media Manufacturing)

TICKER SYMBOLS: IOM

SPECIAL FEATURES: COMPANY

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TS3/9/8

3/9/8 (Item 3 from file: 148)

DIALOG(R)File 148:Gale Group Trade & Industry DB  
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02493589 SUPPLIER NUMBER: 03845983 (THIS IS THE FULL TEXT)  
**Texas Instruments leads industry in targeting cost of ownership as market focus to low-end minicomputer business.**  
PR Newswire, NYPR10  
July 2, 1985  
LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT  
WORD COUNT: 701 LINE COUNT: 00056

## TEXT:

AUSTIN, Texas, July 2 /PRNewswire/ -- In a series of significant announcements enhancing the Business System 300A minicomputer line, Texas Instrument's (NYSE: TXN) Data Systems Group (DSG) is leading the industry in targeting cost of ownership as the major factor in adding value and market focus to the low-end minicomputer business.

According to Wendell Harrison, DSG's network systems marketing manager, "The introduction of super-micros has added some confusion to the low-end minicomputer business. The enhancements we have made focus our product towards those businessmen that are predicting continued long-term growth. For these people, cost of ownership is a crucial part of the buying decision. Our new enhancements lower the entry costs into a family of computers that preserves and builds upon previous investments, increases reliability, and provides extensive and inexpensive long-term warranty options."

The enhancements, effective July 1, include twice the operating memory at no additional cost, a standard one-year or optional three-year warranty plan, and increased reliability through the use of 256K Dynamic Random Access Memory (DRAM) chips and the field-tested WD800A disk system. In addition, TI will be providing field service for the Octacomm TM MCPU/300 Multiplexor, a third-party product that more than doubles the terminal capacity of the Business System 300A.

Doubling the memory means that all Business System 300A models will now have a standard 512K random access memory instead of 256K. In addition, the larger Business System 300A models, the 373A, 374A, and 375A will be available with one megabyte of on-board memory. The 256K DRAMs incorporated in the Business System increase the maximum memory capacity from one megabyte up to 1.75 megabytes allowing larger application programs to be run without a degradation in performance.

In addition, 256K DRAMs can increase reliability by providing twice the amount of memory with one-half the number of chips on the processor board.

The warranty plans now available for the Business System 300A line are unique in the industry. The previous plan offered standard 90-day on-site warranties. The enhancements extend this to one year of carry-in service, with an option to convert to on-site coverage. Added to this is an optional three-year warranty that is available for either on-site or carry-in service. The standard maintenance contract rates that allow a user to pay for service on a monthly basis have also been reduced.

The new warranty and maintenance program is made possible by the incorporation of 256K DRAM technology and the field proven reliability of the WD800A 5-1/4 inch hard disk drive. This extensive plan will dramatically cut the cost of ownership of these systems. Over a three-year period, the new warranty plan will cut carry-in maintenance rates by 45 to 54 percent and on-site maintenance rates by 25 to 36 percent.

In addition to these system and warranty enhancements, TI will now

provide contractual nationwide service for the Octacomm MCPU/300 Multiplexor. This product, produced and marketed by Responsive Terminal Systems and Houston Computer Services, allows a TI Business System 300A to support up to 15 terminals -- more than doubling the current limit. This announcement means that Business System 300A customers who use the Octacomm Multiplexor can expand their system terminal limit and have a convenient single-vendor solution for service.

The data systems group of Texas Instruments Inc. designs, develops, manufactures, and markets a wide range of personal and business computer systems, terminals and printers worldwide. As a leader in research and commercialization of artificial intelligence, DSG is committed to providing easier-to-use, cost-effective and increasingly sophisticated computer systems.

Pricing and availability of products and programs valid only in the United States.

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Editors: Please refer all reader inquiries to: Texas Instruments Inc., Data Systems Group, P. O. Box 809063, Dept. H-801, Dallas, 75380-9063, 1-800-527-3500.

Octacomm is a trademark of Houston Computer Services Inc.

/CONTACT: Sue Metzler of Texas Instruments, 512-250-7302/

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COMPANY NAMES: Texas Instruments Inc.--Marketing

INDUSTRY CODES/NAMES: BUS Business, General

DESCRIPTORS: computer industry--Marketing; Computers--Finance

SIC CODES: 3571 Electronic computers

TICKER SYMBOLS: TXN

FILE SEGMENT: NW File 649

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16/9/13 (Item 8 from file: 148)

DIALOG(R) File 148:Gale Group Trade & Industry DB  
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02326641 SUPPLIER NUMBER: 03713092 (THIS IS THE FULL TEXT)

**Photo-processing rivals multiply; so do promotions.**

Discount Store News, v24, p93(2)

April 1, 1985

ISSN: 0012-3587 LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT

WORD COUNT: 856 LINE COUNT: 00065

TEXT:

The photo processing business is due for some heavy hoopla this year, discounters say.

They're pulling out the stops to protect one of the highly promotional photo department's best businesses from encroachment by other retailers, especially supermarkets.

With some discounters taking in up to a quarter of their photo shop sales dollars in a category with no inventory and no freight, that earns average gross margins between 25% and 35%, a lot's at stake.

The supers are using photo finishing services at near cost totally as a traffic builder, discounters feel. To combat this straight low-price tactic, discounters are counterattacking with a variety of promotional packages that tie processing into film and other merchandise and exploit the exploding market for 35mm autofocus cameras.

But while similar kinds of drum beating are developing from chain to chain, discounters' opinions vary on just how much of their processing business they can keep sheltered from admitted competition.

Most optimistic about making gains in processing are those who've only added 35mm cameras within the last year or so. They see new tie-ins.

Typical is Murphy's Mart camera buyer Frank Dziabiak, who thinks he's developed a processing program that will boost sales for the service 15% this year and even raise margins 4%-5%.

Mainstays of Dziabiak's efforts are an offer of two copies of every print for just a dollar over regular processing cost and the Pro Package. The Pro Package offers 4 in. x 6 in. instead of regular 3-1/2 in. x 5 in. prints from 35mm film--at no price break on the extra cost of the bigger enlargements.

The many novice purchasers of autofocus 35mm cameras, pleased with a newfound quality to their picture-taking, are, however, flocking to the larger prints, Dziabiak said. He said it was the extra dollars earned here that would give him the sales increases he's projected.

Dziabiak also gives a coupon for free film developing to each camera purchaser and ties once-a-month photo processing promos in Murphy's Mart's circular to a photo album promotion. Photo processing is beginning to get heavy radio backing, too, he said.

In Agreement

John Branham, Heck's camera buyer, thinks similar programs will also protect his department's 12% of sales registered in photo finishing.

Branham admitted to feeling the competitive heat and said his strategies were specifically designed to "take us out of the 99 , 12 exposure rat race."

The gambit he's getting the best response to from Heck's customers, he reported, is his Twingles program, an offer of two prints of every exposure at a single price, similar to the Murphy's Mart deal.

With gross margins for processing "easily 25%--the single biggest factor pulling up the department's gross," Branham said he planned continued aggressive promotions and tie-ins for the area. "Every one of our 26 circulars is going to have photo processing along with a camera and film offer," he said.

At least as aggressive in terms of new programs, but less optimistic about the photo finishing business as a whole, is a cataloger in northwest Pennsylvania.

The buyer for this chain, which earns 30% average gross margins from its film processing business, said he expected to "struggle to remain even."

Since supermarkets "jumped in with both feet the last two years," gaining their effectiveness from weekly price advertising, "the pie hasn't grown," he asserted.

To keep his slice from shrinking, too, this retailer said he's promoting 3-packs of Kodak films at 50% savings in the monthly flier hoping to push both consumption and return visits to the store for processing.

In addition, he said, he's considering launch of a private label program tied to an ongoing offer of a free roll of film for every roll brought in for processing.

At least a few others are kicking around the idea of private label film programs to give a kick to department traffic and add on processing business.

But many feel that volume in Kodak is so great it offset anything private label could offer in margins, traffic or processing gains.

Branham noted that he's looking at a program with Fuji because in terms of customers' likelihood to return for processing "it's somewhere in between" Kodak and private label.

While the discounters surveyed see their most viable option for protecting their turf in photo finishing in the creation of attractive promotional packages, some room for cutting back on the cost side may exist, too.

Edward Samiljan, president of TruColor Foto, which handles about two-thirds of Target's photo processing, said he foreseen a growing trend to self-service order write-up and pickup, too, at mass merchants.

Target instituted such a program chainwide two years ago. For pickup, orders are filed alphabetically by customer name in open gondolas. Shoppers pull their own orders out and bring them to a register to be rung up.

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SPECIAL FEATURES: illustration; photograph

INDUSTRY CODES/NAMES: RETL Retailing

DESCRIPTORS: Murphy's Mart--Management; Heck's--Management; Photographic film processing industry--Management; Discount stores--Management

NAMED PERSONS: Branham, John--Management

SIC CODES: 5331 Variety stores; 7384 Photofinishing laboratories

FILE SEGMENT: TI File 148

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TS3/9/8

3/9/8 (Item 3 from file: 148)

DIALOG(R) File 148:Gale Group Trade &amp; Industry DB

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02493589 SUPPLIER NUMBER: 03845983 (THIS IS THE FULL TEXT)

**Texas Instruments leads industry in targeting cost of ownership as market focus to low-end minicomputer business.**

PR Newswire, NYPR10

July 2, 1985

LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT

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AUSTIN, Texas, July 2 /PRNewswire/ -- In a series of significant announcements enhancing the Business System 300A minicomputer line, Texas Instrument's (NYSE: TXN) Data Systems Group (DSG) is leading the industry in targeting cost of ownership as the major factor in adding value and market focus to the low-end minicomputer business.

According to Wendell Harrison, DSG's network systems marketing manager, "The introduction of super-micros has added some confusion to the low-end minicomputer business. The enhancements we have made focus our product towards those businessmen that are predicting continued long-term growth. For these people, cost of ownership is a crucial part of the buying decision. Our new enhancements lower the entry costs into a family of computers that preserves and builds upon previous investments, increases reliability, and provides extensive and inexpensive long-term warranty options."

The enhancements, effective July 1, include twice the operating memory at no additional cost, a standard one-year or optional three-year warranty plan, and increased reliability through the use of 256K Dynamic Random Access Memory (DRAM) chips and the field-tested WD800A disk system. In addition, TI will be providing field service for the Octacomm TM MCPU/300 Multiplexor, a third-party product that more than doubles the terminal capacity of the Business System 300A.

Doubling the memory means that all Business System 300A models will now have a standard 512K random access memory instead of 256K. In addition, the larger Business System 300A models, the 373A, 374A, and 375A will be available with one megabyte of on-board memory. The 256K DRAMs incorporated in the Business System increase the maximum memory capacity from one megabyte up to 1.75 megabytes allowing larger application programs to be run without a degradation in performance.

In addition, 256K DRAMs can increase reliability by providing twice the amount of memory with one-half the number of chips on the processor board.

The warranty plans now available for the Business System 300A line are unique in the industry. The previous plan offered standard 90-day on-site warranties. The enhancements extend this to one year of carry-in service, with an option to convert to on-site coverage. Added to this is an optional three-year warranty that is available for either on-site or carry-in service. The standard maintenance contract rates that allow a user to pay for service on a monthly basis have also been reduced.

The new warranty and maintenance program is made possible by the incorporation of 256K DRAM technology and the field proven reliability of the WD800A 5-1/4 inch hard disk drive. This extensive plan will dramatically cut the cost of ownership of these systems. Over a three-year period, the new warranty plan will cut carry-in maintenance rates by 45 to 54 percent and on-site maintenance rates by 25 to 36 percent.

In addition to these system and warranty enhancements, TI will now

provide contractual nationwide service for the Octacomm MCPU/300 Multiplexor. This product, produced and marketed by Responsive Terminal Systems and Houston Computer Services, allows a TI Business System 300A to support up to 15 terminals -- more than doubling the current limit. This announcement means that Business System 300A customers who use the Octacomm Multiplexor can expand their system terminal limit and have a convenient single-vendor solution for service.

The data systems group of Texas Instruments Inc. designs, develops, manufactures, and markets a wide range of personal and business computer systems, terminals and printers worldwide. As a leader in research and commercialization of artificial intelligence, DSG is committed to providing easier-to-use, cost-effective and increasingly sophisticated computer systems.

Pricing and availability of products and programs valid only in the United States.

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Editors: Please refer all reader inquiries to: Texas Instruments Inc., Data Systems Group, P. O. Box 809063, Dept. H-801, Dallas, 75380-9063, 1-800-527-3500.

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DIALOG(R) File 16:Gale Group PROMT(R)

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**InterMedia Finds Modems Hot Seller**

HAUGSTED, LINDA

Multichannel News, v19, n28, p32

July 13, 1998

ISSN: 0276-8593

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**TEXT:**

InterMedia Partners' Kingsport, Tenn., franchise has declared its high-speed-data operation to be in the black and way ahead of schedule.

The 33,000-subscriber system anticipated that 1,400 to 1,500 homes would be signed on by now, but 1,800 customers are on board after only 12 months, representing more than 5 percent penetration of a combination of dialup Internet and cable-modem customers.

"We were recently voted the No. 1 ISP [Internet-service provider] in a readers' choice poll in the local paper," said Greg Perica, general manager for InterMedia in Kingsport. The cable company's high-speed offering beat out five competitors in the Kingsport Times poll.

The system launched data with the assistance of its vendor, Online System Services, initially using one-way telco-return technology. InterMedia has completed a rebuild, and it will sell its high-speed service, dubbed "i2u," as a two-way service.

Perica said the reasons for the quick success are many, but he offered one major piece of advice to other operators jumping into the category.

"Don't try to run this business with cable guys," he said.

The system hired people with experience in technical support for online services like Prodigy Services Co.

"I'd advertise for help-desk people and get hundreds of applications. If I advertise for a CSR [customer-service representative], I'm lucky if I get 10," he said, adding that people are anxious to work in this field.

InterMedia and its vendor partner believe that their success can be replicated in other systems. Kingsport is not an affluent or high tech-identified community -- it is primarily blue-collar, with a median annual income of \$27,000.

But the cable system used the benefits of its core business (cross-channel promotion, a good community image) to nurture the new product. Also key were alliances with local retailers and community groups. With the former, InterMedia struck a deal with Computer Associated Technology to be its "official computer store."

The retailer offers personal-computer buyers one free month of InterMedia Internet service if the consumer buys a PC that is preloaded with the i2u Internet-access software. Two other computer stores -- Computer World and AAA Computers -- earn finder's fees equal to the customers' first-month bills for every Internet customer that they sign up, Perica said.

And i2u customers benefit from access to proprietary local content, which boasts 30,000 visitors per month. InterMedia showcases Web sites from the local ABC TV affiliate, an FM-radio station, a local business coalition named Kingsport Tomorrow and the Chamber of Commerce.

The media companies also advertise the Internet product over their airwaves. The system earns between \$500 and \$1,000 per month, per business



producing Web sites for local companies. InterMedia hopes to improve that by designing more sophisticated sites for which it can charge \$10,000 to \$15,000.

The local content is among the factors that have prompted people into paying InterMedia \$17.95 per month for unlimited-use dial-up Web access or \$29.95 for cable-modem service.

Modem customers can buy the hardware from local retailers for \$199 (95 percent have taken the purchase option) or rent the equipment monthly for \$10. Installation is \$105. Perica said no customers have been allowed to self-install, but that will be an option when OpenCable-compliant modems come on the market.

InterMedia is the only wired-cable customer signed with OSS, said Bill Cullen, a cable veteran and chief operating officer of the company. Although Kingsport is not technically a beta site for the Internet product, OSS did upgrade the software twice based on what it learned there, and two more are on the drawing board, he said.

"We're just getting started in the wired area. We're pleased with the validation and verification of the product" in Kingsport, he added.

The vendor provides head-end equipment, a proprietary account-management system and training, and it shares Internet revenues with the operator.

The cable Internet offering has succeeded with a very competitive price. Some 95 percent of the customers also take cable, and those homes get a \$2 monthly discount on their Internet bill from the operator.

Perica is already contemplating expansion: The service will migrate into the Knoxville, Tenn., InterMedia system, which will add 50,000 homes passed. And the general manager also plans to talk to neighboring Comcast Corp. and Rifkin & Associates Inc. systems about expanding into their counties in exchange for finder's fees to the local operator.

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connections that link them to visitors must be fast and powerful enough to quickly respond to all the visitors' requests to view your site.

Many businesses prefer the complete control of purchasing, setting up, and managing their own Web server hardware and software. Other small- and medium-sized e-commerce businesses prefer to turn to an Internet Service Provider (ISP) or Web hosting company, instead of investing in the hardware, software, and infrastructure necessary to get online. For a monthly fee, ISPs and Web hosting companies will connect your site to the Internet at high speed via one of their Web servers, allowing the site to be viewed by anyone with an Internet connection and a Web browser. The host provides your site with space on a server, and also offers Web server software, access to its high-speed Internet connection, tools for managing and maintaining your site, customer support, e-commerce features, and more. There are hundreds of ISP and Web hosting options to choose from, so look for one that can meet all your needs.

## A. What to Look for in a Web Hosting Company

- **Shared hosting or dedicated server?** Shared hosting is an arrangement in which your site is housed on the same host server with several other Web sites. This is an economical solution for smaller sites. Paying the host for your own dedicated server, a solution used by larger and busier sites, provides faster access and ensures that your site will be accessible to visitors 100 percent of the time (instead of sharing Web server speed and power with other sites). Does your ISP or Web hosting provider offer both options?
- **Hard-disk storage space.** Smaller sites may need only 300-500 MB (megabytes) of Web site storage space, while busier e-commerce sites may need at least 9 GB (gigabytes) of space—or their own dedicated Web server. As your site grows, your ISP should be able to accommodate you with a range of options.
- **Availability.** If you run an e-commerce business, your site must be accessible to customers 24 hours a day. ISPs and Web hosts maximize the availability of the sites they host using techniques like load balancing and clustering. Can your ISP promise near-100-percent availability?
- **E-mail accounts.** E-mail accounts that match your domain name are often available from your ISP. Are they included with your monthly access and hosting fee?
- **SSL Encryption:** The security of the credit card numbers and other personal information customers send you should be a top concern. Does your ISP or Web host protect your site with an SSL server ID? See Step IV below to learn more about Web site security.
- **Support.** A big part of the value of turning to an ISP or Web host is that you don't have to worry about keeping the Web server running. Does your host offer 24x7 customer service?

## B. Where to Find the Right Web Host

VeriSign's Secure Site ISP Program's Premier Partners include the industry's leading ISPs and Web hosting companies, such as:

- Critical Path
- FirstWorld
- Interland
- Interliant
- MindSpring
- NaviSite
- PSINet
- RackSpace
- Verio

## IV. Step Four: Secure Your Site

With your Internet identity established and your site built and hosted, it's time to turn your online storefront into a thriving e-commerce business. To do it, you must win your customers' trust. Eighty-five percent of Web users surveyed reported that a lack of security made them uncomfortable sending credit card numbers over the Internet. E-merchants who can win the confidence of these customers will gain their business and their loyalty—and an enormous opportunity for grabbing market share and expanding sales.

### A. The Risks of E-Commerce

In person-to-person transactions, security is based on physical cues. Consumers accept the risks of using credit cards in places like department stores because they can see and touch the merchandise and make judgments about the store. On the Internet, without those physical cues, it is much more difficult for customers to assess the safety of your business. Also, serious security threats have emerged:

- 
- **Spoofing**—The low cost of Web site creation and the ease of copying existing pages makes it all too easy to create illegitimate sites that appear to be operated by established organizations. Con artists have illegally obtained credit card numbers by setting up professional-looking Web sites that mimic legitimate businesses.
  - **Unauthorized disclosure**—When purchasing information is transmitted “in the clear,” without proper security and encryption, hackers can intercept the transmissions to obtain customers' sensitive information—like credit card numbers.
  - **Unauthorized action**—A competitor or disgruntled customer can alter a Web site so that it malfunctions or refuses service to potential clients.
  - **Eavesdropping**—The private content of a transaction, if unprotected, can be intercepted en route over the Internet.
  - **Data alteration**—The content of a transaction can be not only intercepted, but also altered en route, either maliciously or accidentally. User names, credit card numbers, and dollar amounts sent without proper security and encryption are all vulnerable to such alteration.

To take advantage of the opportunities of e-commerce and avoid the risks, you must find the answers to questions like:

**“How can I be certain that my customers’ credit card information is protected from online eavesdroppers?”**

**“How can I reassure customers who come to my site that they are doing business with me, not with a fake set up to steal their credit card numbers?”**

**“Once I’ve found a way to authoritatively identify my business to customers and protect private customer information on the Web, what’s the best way to let customers know about it, so that they can confidently transact business with me?”**

The process of addressing these general security questions boils down to these goals:

- **Authentication:** Your customers must be able to assure themselves that they are in fact doing business with you—not a “spoof” site masquerading as you.
- **Confidentiality:** Sensitive information and transactions on your Web site, such as the transmission of credit card information, must be kept private and secure.
- **Data integrity:** Communication between you and your customers must be protected from alteration by third parties in transmission on the Internet.
- **Proof of communication:** A person must not be able to deny that he or she sent a secured communication or made an online purchase.

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## **B. The Trust Solution: SSL Server IDs for Authentication and Encryption**

Digital certificates for your Web site (or “Server IDs”) are the answer for these security questions. Installed on your Web server, a Server ID is a digital credential that enables your customers to verify your site’s authenticity and to securely communicate with it. Server IDs allow your e-business to provide customers with the world’s highest level of trust. A Server ID assures them that your Web site is legitimate, that they are really doing business with you, and that confidential information—such as credit card numbers—transmitted to you online is protected.

## **C. How Server IDs Work**

Server IDs take advantage of the state-of-the-art Secure Sockets Layer (SSL) protocol, developed by Netscape. SSL has become the universal standard for authenticating Web sites to Web browser users, and for encrypting communications between browser users

and Web servers. Because SSL is built into all major browsers and Web servers, simply installing a digital certificate, or Server ID, enables SSL capabilities.

**SSL server authentication** allows users to confirm a Web server's identity. SSL-enabled client software, such as a Web browser, can automatically check that a server's certificate and public ID are valid and have been issued by a certificate authority (CA)—such as VeriSign—listed in the client software's list of trusted CAs. SSL server authentication is vital for secure e-commerce transactions in which, for example, users send credit card numbers over the Web and first want to verify the receiving server's identity.

**An encrypted SSL connection** requires that all information sent between a client and a server to be encrypted by the sending software and decrypted by the receiving software, protecting private information from interception over the Internet. In addition, all data sent over an encrypted SSL connection is protected with a mechanism for detecting tampering—that is, for automatically determining whether the data has been altered in transit. This means that users can confidently send private data, such as credit card numbers, to a Web site, trusting that SSL keeps it private and confidential.

The Server ID process works as follows:

1. A customer contacts your site and accesses a page secured by a Server ID (indicated by a URL that begins with "https:" instead of just "http:" or by a message from the browser).
  2. Your server responds, automatically sending the customer your site's digital certificate, which authenticates your site.
  3. Your customer's Web browser generates a unique "session key" to encrypt all communications with the site. The user's browser encrypts the session key itself with your site's public key so only your site can read the session key.
  4. A secure session is now established. It all takes only seconds and requires no action by the customer. Depending on the browser, the customer may see a key icon becoming whole or a padlock closing, indicating that the session is secure.
- 

SSL Server IDs come in two strengths: 40-bit and 128-bit (the numbers refer to the length of the "session key" generated for each encrypted transaction). The longer the key, the more difficult it is to break the encryption code. 128-bit SSL encryption is the world's strongest: according to RSA Labs, it would take a trillion years to crack a 128-bit session key using today's technology. The primary difference between the two types of VeriSign Server IDs is the strength of the SSL session that each enables. Microsoft and Netscape offer two versions of their Web browsers, export and domestic, that enable different levels of encryption depending on the type of Server ID with which the browser is communicating.

## **D. How to Get SSL Server IDs**

VeriSign—the Internet Trust Company—offers a complete range of products and services to help you secure your Web site.

## 1. VeriSign Commerce Site and Secure Site Solutions

VeriSign provides SSL Server IDs in two encryption strengths:

- **VeriSign 128-bit SSL (Global Server) IDs** enable the world's strongest SSL encryption with both domestic and export versions of Microsoft® and Netscape® browsers. 128-bit SSL Global Server IDs are the standard for large-scale online merchants, banks, brokerages, health care organizations, and insurance companies worldwide.
- **VeriSign 40-bit SSL (Secure Server) IDs** are ideal for lower-volume, security-sensitive Web sites, intranets, and extranets.

**Commerce Site Services**, exclusively from VeriSign, are complete, e-commerce solutions that are ideal for e-merchants and online stores.

- **Commerce Site** includes a 40-bit SSL (Secure Server) ID and VeriSign Payflow Pro online payment management service, plus an array of additional value-added services. VeriSign Payflow online payment services enable businesses to easily accept, manage, and process payments electronically. (See Step Five below to learn more about facilitating e-commerce payments on your site.)
- **Commerce Site Pro** includes a 128-bit SSL (Global Server) ID, VeriSign Payflow Pro, and an array of additional value-added services.

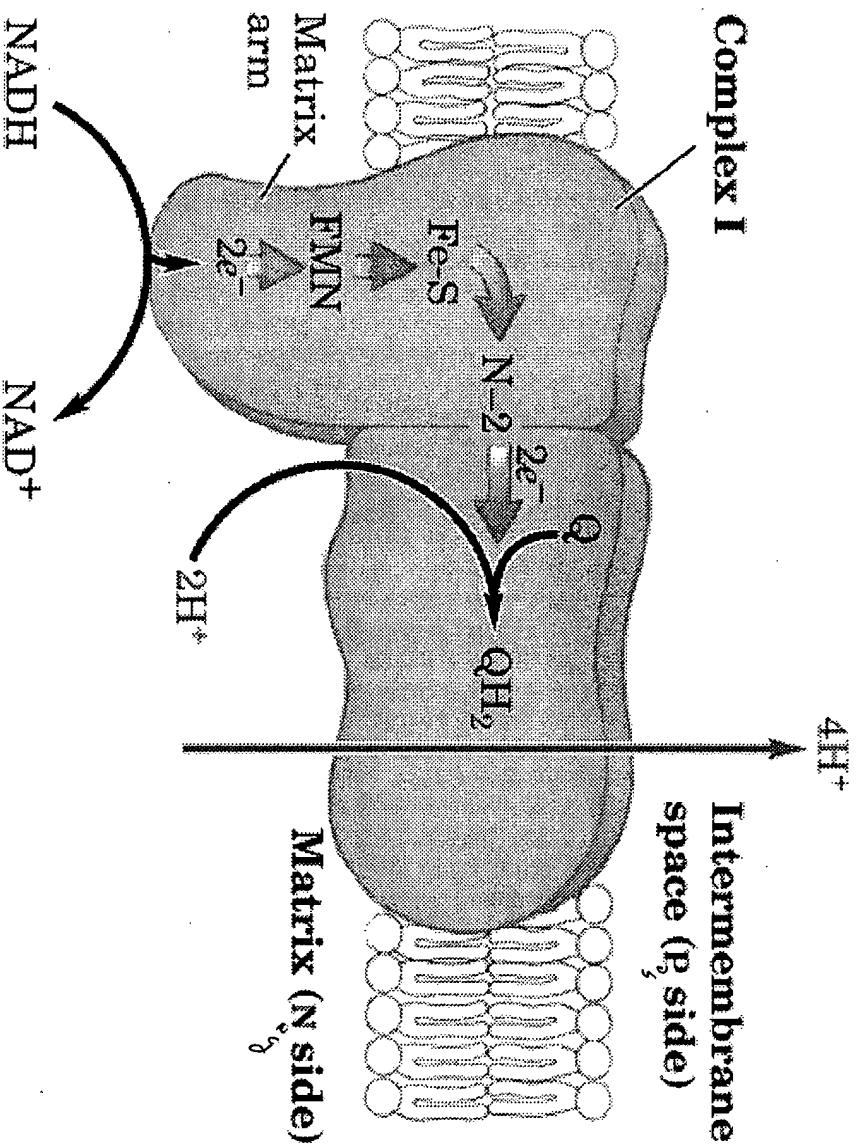
**Secure Site Services** are best for Web sites, intranets, and extranets, that require the leading SSL certificates and Web site services.

- **Secure Site** includes a 40-bit SSL (Secure Server) ID, plus additional value added services.
- **Secure Site Pro** includes a 128-bit SSL (Global Server) ID and value-added services.

Many leading ISPs and Web hosting providers, such as VeriSign's Premier ISP Partners, include VeriSign Server IDs with their e-commerce packages. When choosing an ISP, look for one that offers VeriSign Server IDs. If you are obtaining your Server ID through your ISP or Web hosting company, your host may ask you to enroll for your certificate yourself, because you are the owner of the domain name to which the Server ID will correspond. Make sure you ask your hosting company for the information you'll need to complete the VeriSign enrollment process, including:

- **A CSR, or "Certificate Signing Request."** This is an encrypted file, generated by the Web server that is hosting your site. This file will contain a public key, the name of your company, its location, and your URL. Because your Web hosting provider operates the Web server on which your site is hosted, your Web hosting provider must generate the CSR and send it to you for use during Server ID enrollment.
- **The kind of server software your Web hosting provider uses.** As part of the VeriSign Server ID enrollment process, you'll be asked to select your Server Software Vendor, in addition to your CSR.
- **A technical contact.** Your Web hosting provider should be able to give you the name of its appropriate technical contact for you to complete the enrollment process.

Complex I (NADH:ubiquinone reductase) catalyzes the transfer of a hydride ion from NADH to FMN, from which two electrons pass through a series of Fe-S centers to the iron-sulfur protein N-2 in the matrix arm of the complex. Electron transfer from N-2 to ubiquinone on the membrane arm forms  $\text{QH}_2$ , which diffuses into the lipid bilayer.



$\text{e}^-$  transferred in form of hydride ion

Electron transfer to  $\text{QH}_2$  simultaneously drives transport from the matrix to the intermembrane space of four protons per pair of electrons.

This proton flux produces an electrochemical potential across the inner membrane which conserves some of the energy released by the electron-transfer reactions.

The electrochemical potential drives ATP synthesis (chemiosmotic hypothesis of Peter Mitchell, 1961).

Electron transfer and proton transport are

coupled vectorial processes

↳ similar to ATP hydrolysis + muscle contract.



N negative side (matrix)

P positive side (intermembrane space)



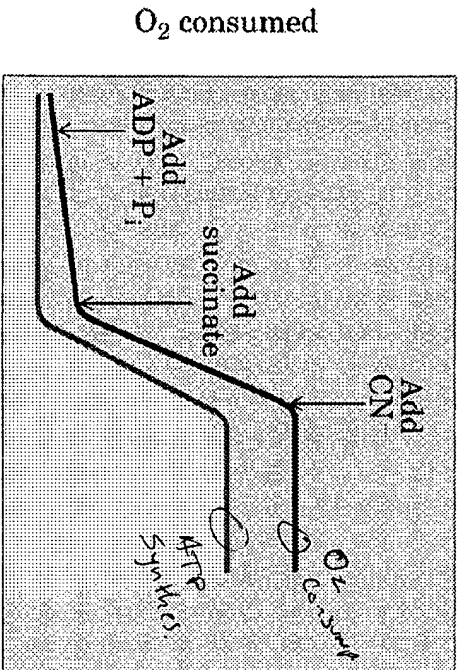
How do we demonstrate chemios. hypth. is correct?

In experiments demonstrating coupling of electron transfer and ATP synthesis, mitochondria are suspended in a buffered medium and an  $O_2$  electrode is used to monitor  $O_2$  consumption.

Succinate (a source of electrons) is required for both respiration (black) and ATP synthesis (red).

Cyanide, which blocks electron transfer between cytochrome oxidase and  $O_2$ , inhibits both respiration and ATP synthesis.

Cannot use mitochondria fractions to synh. ATP b/c cannot form gradient.



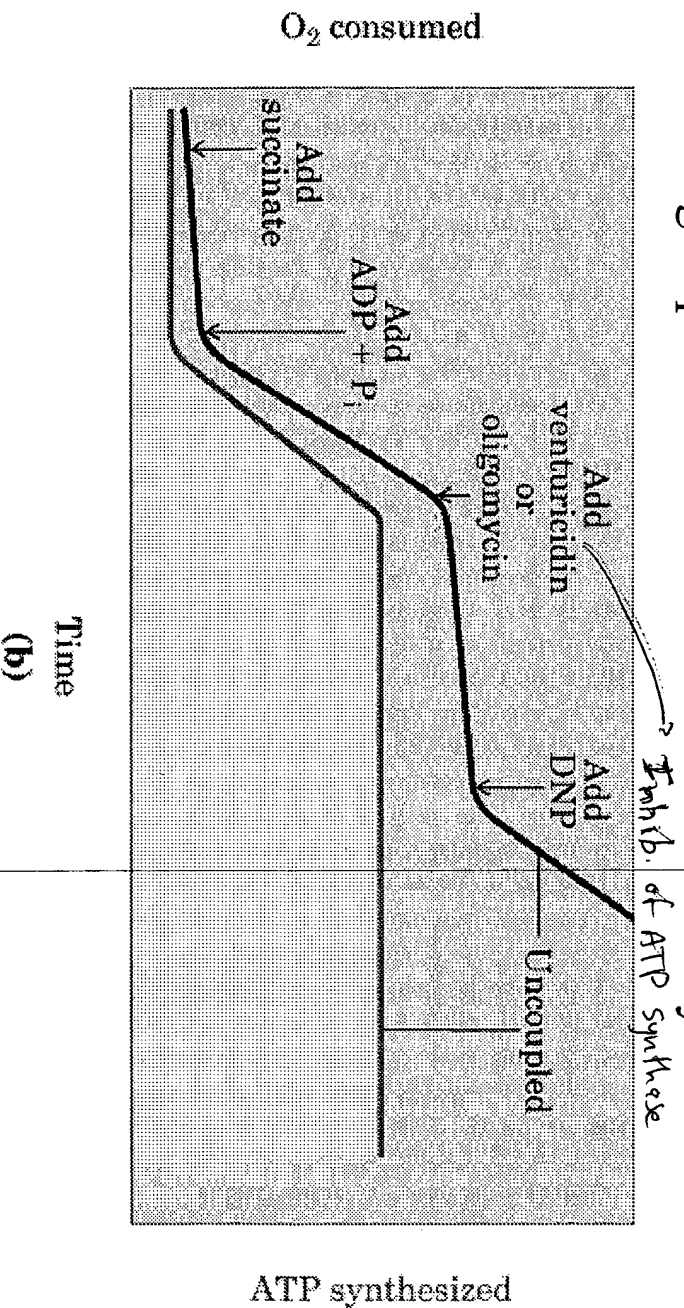
Time  
(a)

Results show processes are linked

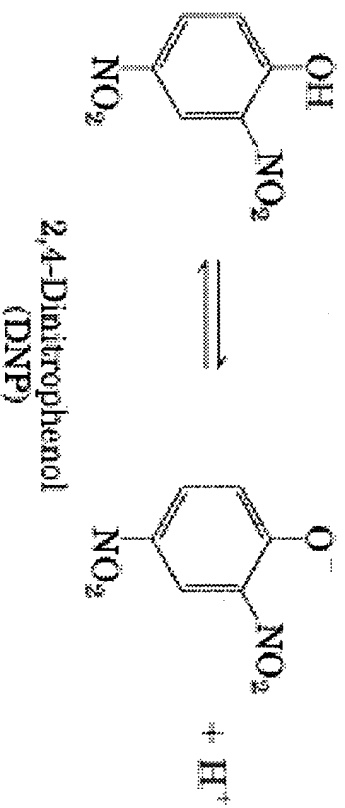
Mitochondria provided with only succinate respire and synthesize ATP only when ADP and  $P_i$  are added.

Inhibitors of ATP synthase (venturicidin and oligomycin) block both respiration and ATP synthesis.

Dinitrophenol (DNP) is an uncoupler, allowing respiration to continue without ATP synthesis.



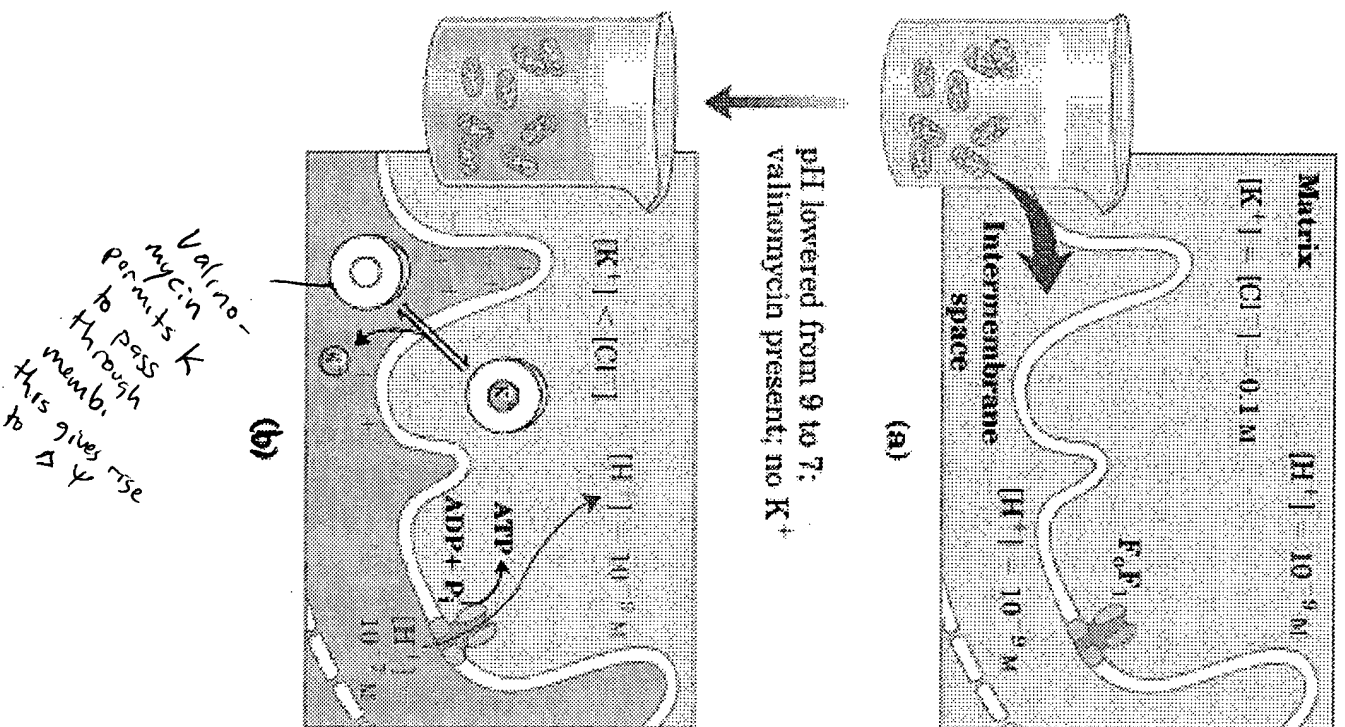
Why is it impossible for electron flow to continue when ATP synthesis is blocked?  
 If protons not allowed to return, potential becomes too great



DNP is hydrophobic and a weak acid.

How does this allow it to uncouple respiration and ATP synthase?

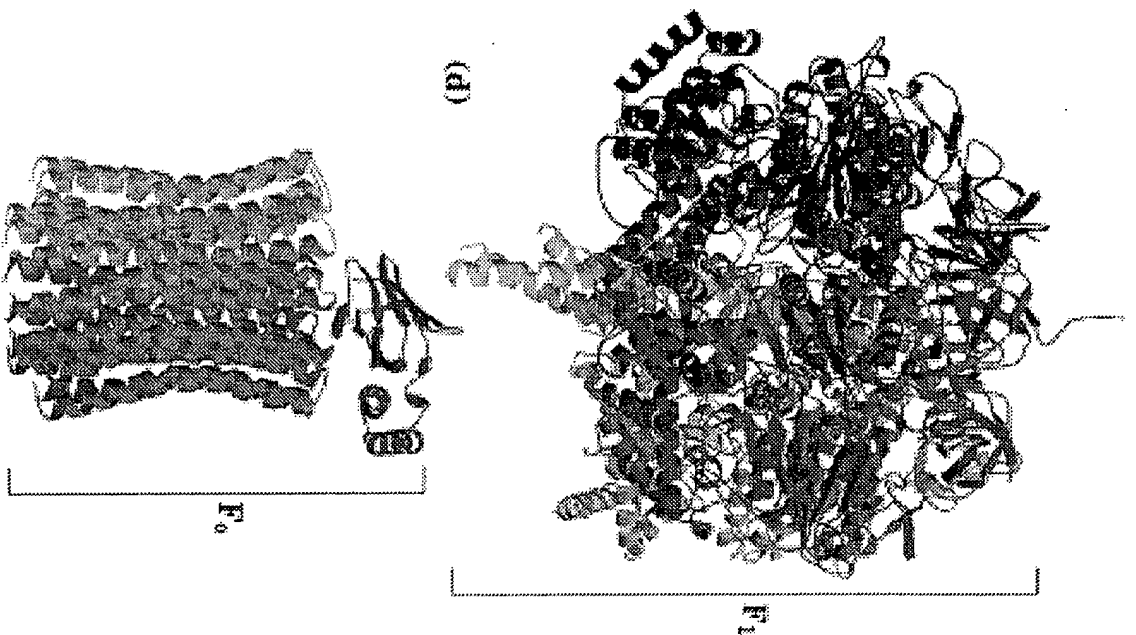
DNP acts as shuttle - releases protons on other side of membrane



## Experiment demonstrating chemiosmotic hypothesis

Isolated mitochondria are first incubated in a pH 9 buffer containing 0.1 M KCl. Slow leakage of buffer and KCl into the mitochondria eventually brings the matrix into equilibrium with the surrounding medium. No oxidizable substrates are present.

Mitochondria are now separated from the pH 9 buffer and resuspended in pH 7 buffer containing the potassium-specific ionophore valinomycin but no KCl. The change in buffer creates a difference of two pH units across the inner membrane of the mitochondria. The outward flow of  $K^+$ , carried down its concentration gradient without a counterion by valinomycin, creates a charge imbalance across the membrane (matrix negative). The chemical and electric potentials created are enough to support ATP synthesis in the absence of an oxidizable substrate.

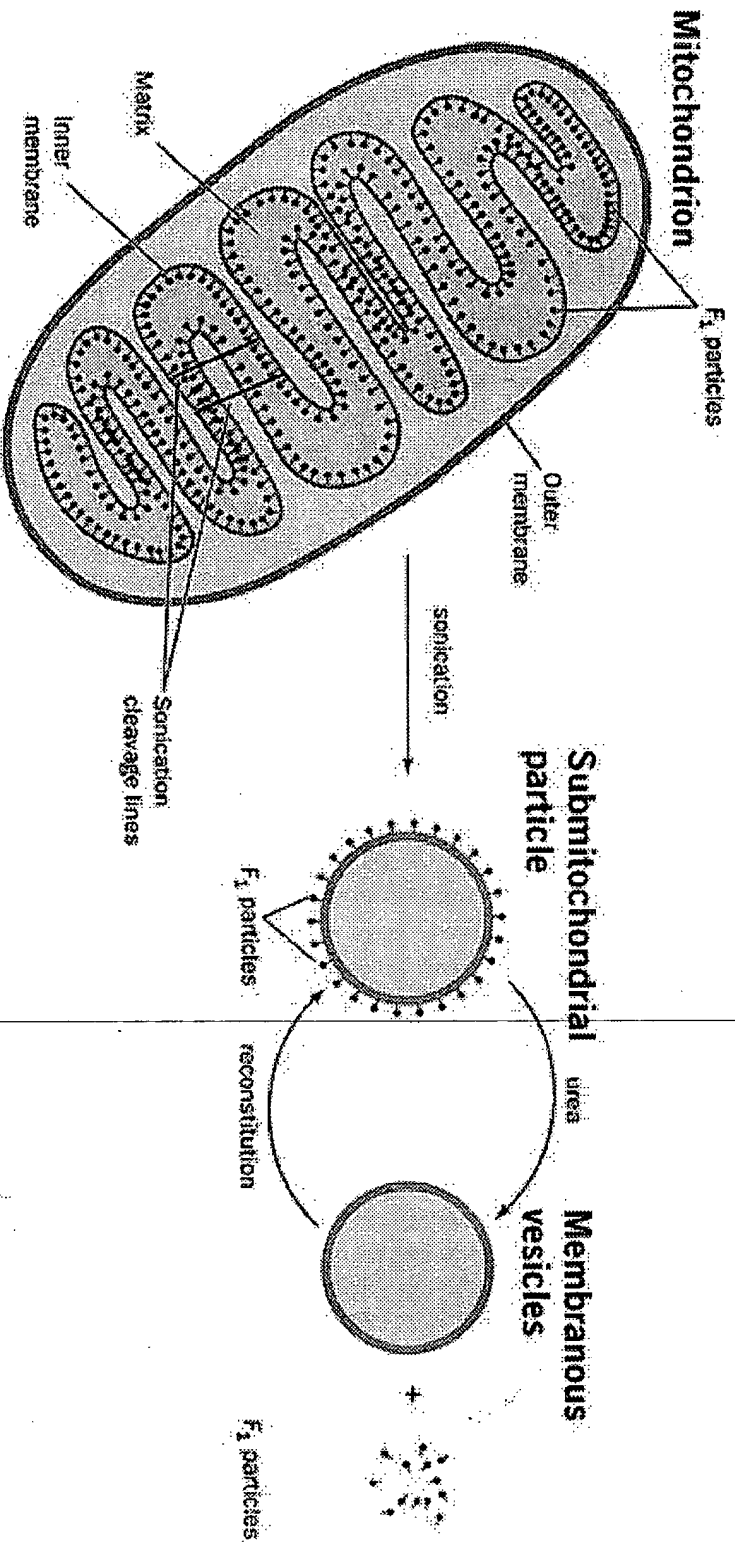
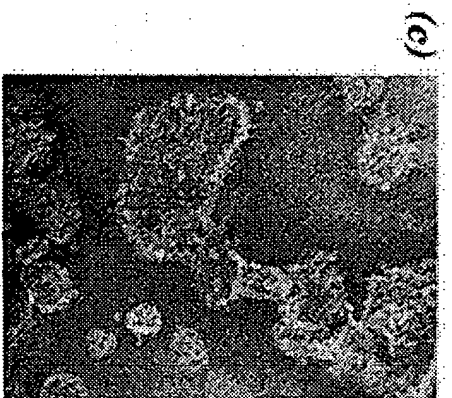
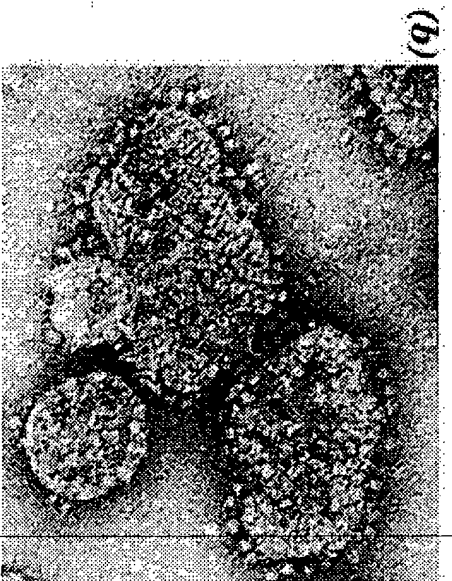
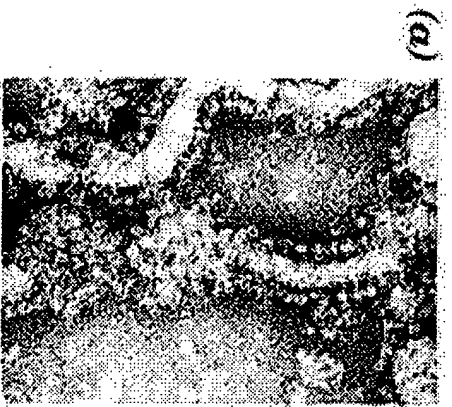


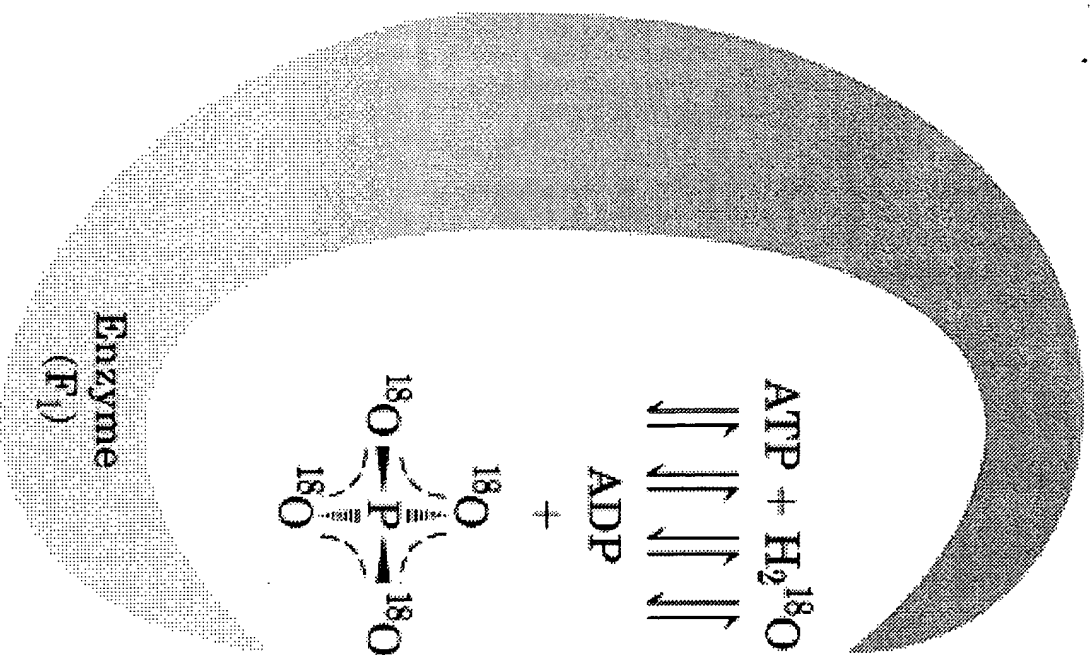
ATP synthase contains two distinct components:

F<sub>1</sub>, a peripheral membrane protein.

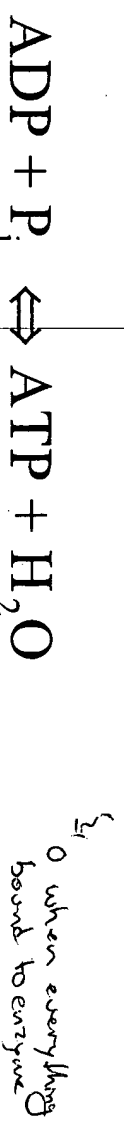
In the absence of a proton gradient, this enzyme can hydrolyze ATP, therefore it is often called F<sub>1</sub> ATPase.

F<sub>0</sub>, an integral membrane protein, has a proton pore.

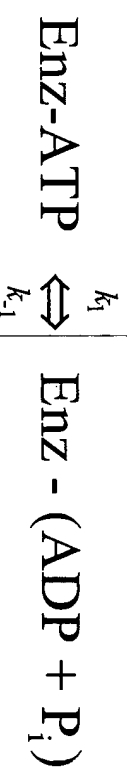




On the surface of  $\text{F}_1$ , even when the enzyme is isolated, ATP synthesis is readily reversible.  $\Delta G = \sim 0 \text{ kJ/mol}$ .



This was demonstrated by isotope exchange into  $\text{P}_i$  in the presence of  $\text{F}_1$  and  $^{18}\text{O}$ -labeled water.



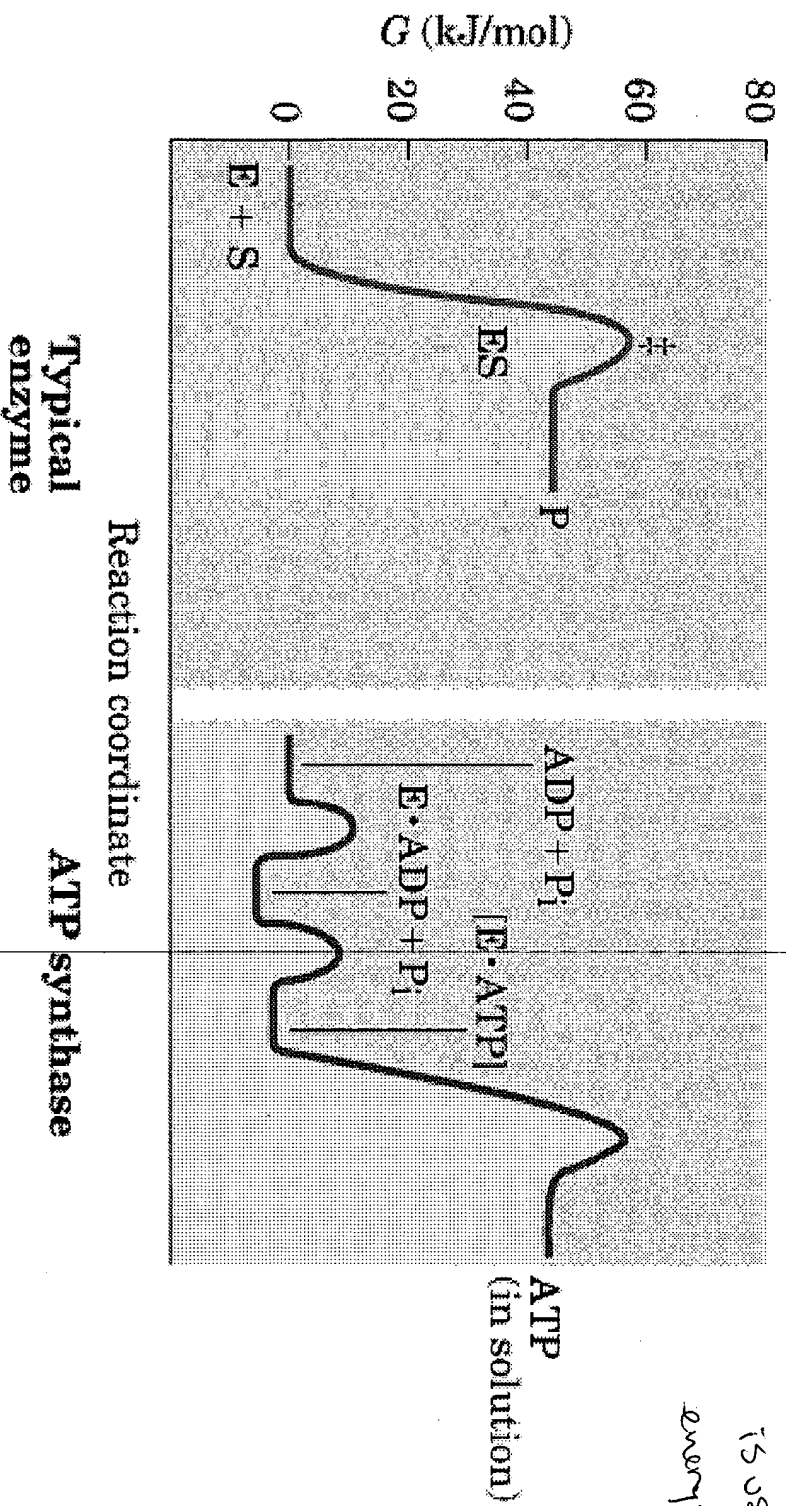
$$K_{\text{eq}} = \frac{k_1}{k_{-1}} = \frac{24 \text{ s}^{-1}}{10 \text{ s}^{-1}} = 2.4$$

$K_{\text{eq}} = \sim 10^5 \text{ M}$  for hydrolysis of ATP free in solution.

$\text{F}_1$  ATPase binds ATP very tightly, but ADP and  $\text{P}_i$  weakly. The tight binding of ATP by the enzyme stabilizes ATP on its surface enough to make ATP formation approximately equivalent to ATP hydrolysis in energetics.

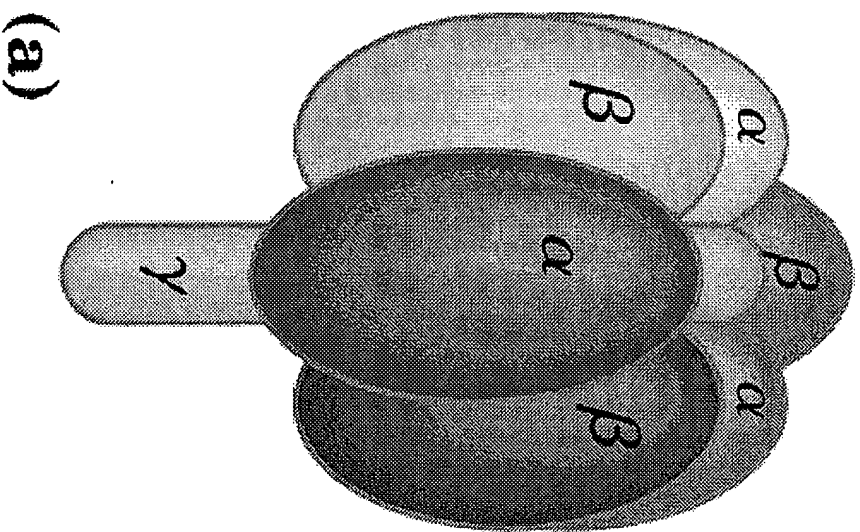
In the reaction catalyzed by ATP synthase, release of ATP from the enzyme is the rate-limiting step. The free energy required to release ATP is provided by ???

energy from proton gradient is used to release energy from enzyme





In  $F_1$ , three  $\alpha$  and three  $\beta$  subunits are arranged like slices of an orange. The central stalk is  $\gamma$ .



(a)

From above

Each subunit has a substrate binding site, but their conformations are not equivalent. One  $\beta$  subunit has a conformation to bind ATP, one to bind ADP, and the last is empty. These conformational differences are critical to function.

